maximum pilot forces specified in § 23.397(b).

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23–48, 61 FR 5147, Feb. 9, 1996]

§ 23.505 Supplementary conditions for skiplanes.

In determining ground loads for skiplanes, and assuming that the airplane is resting on the ground with one main ski frozen at rest and the other skis free to slide, a limit side force equal to 0.036 times the design maximum weight must be applied near the tail assembly, with a factor of safety of 1.

[Amdt. 23–7, 34 FR 13090, Aug. 13, 1969]

§ 23.507 Jacking loads.

(a) The airplane must be designed for the loads developed when the aircraft is supported on jacks at the design maximum weight assuming the following load factors for landing gear jacking points at a three-point attitude and for primary flight structure jacking points in the level attitude:

(1) Vertical-load factor of 1.35 times the static reactions.

(2) Fore, aft, and lateral load factors of 0.4 times the vertical static reactions.

(b) The horizontal loads at the jack points must be reacted by inertia forces so as to result in no change in the direction of the resultant loads at the jack points.

(c) The horizontal loads must be considered in all combinations with the vertical load.

[Amdt. 23–14, 38 FR 31821, Nov. 19, 1973]

§ 23.509 Towing loads.

The towing loads of this section must be applied to the design of tow fittings and their immediate attaching structure.

(a) The towing loads specified in paragraph (d) of this section must be considered separately. These loads must be applied at the towing fittings and must act parallel to the ground. In addition:

(1) A vertical load factor equal to 1.0 must be considered acting at the center of gravity; and

(2) The shock struts and tires must be in there static positions.

(b) For towing points not on the landing gear but near the plane of symmetry of the airplane, the drag and side tow load components specified for the auxiliary gear apply. For towing points located outboard of the main gear, the drag and side tow load components specified for the main gear apply. Where the specified angle of swivel cannot be reached, the maximum obtainable angle must be used.

(c) The towing loads specified in paragraph (d) of this section must be reacted as follows:

(1) The side component of the towing load at the main gear must be reacted by a side force at the static ground line of the wheel to which the load is applied.

(2) The towing loads at the auxiliary gear and the drag components of the towing loads at the main gear must be reacted as follows:

(i) A reaction with a maximum value equal to the vertical reaction must be applied at the axle of the wheel to which the load is applied. Enough airplane inertia to achieve equilibrium must be applied.

(ii) The loads must be reacted by airplane inertia.

(d) The prescribed towing loads are as follows, where W is the design maximum weight:

Tow point	Position	Load		
		Magnitude	No.	Direction
Main gear	....	0.225W	1	Forward, parallel to drag axis.
			2	Forward, at 30° to drag axis.
			3	Aft, parallel to drag axis.
			4	Aft, at 30° to drag axis.
Auxiliary gear	Swiveled forward	0.3W	5	Forward.
			6	Aft.
	Swiveled aft	0.3W	7	Forward.
			8	Aft.

Tow point	Position	Load		
		Magnitude	No.	Direction
	Swiveled 45° from forward	0.15W	9	Forward, in plane of wheel.
			10	Aft, in plane of wheel.
	Swiveled 45° from aft	0.15W	11	Forward, in plane of wheel.
			12	Aft, in plane of wheel.

[Amdt. 23–14, 38 FR 31821, Nov. 19, 1973]

§ 23.511 Ground load; unsymmetrical loads on multiple-wheel units.

(a) *Pivoting loads.* The airplane is assumed to pivot about on side of the main gear with—

(1) The brakes on the pivoting unit locked; and

(2) Loads corresponding to a limit vertical load factor of 1, and coefficient of friction of 0.8 applied to the main gear and its supporting structure.

(b) *Unequal tire loads.* The loads established under §§ 23.471 through 23.483 must be applied in turn, in a 60/40 percent distribution, to the dual wheels and tires in each dual wheel landing gear unit.

(c) *Deflated tire loads.* For the deflated tire condition—

(1) 60 percent of the loads established under §§ 23.471 through 23.483 must be applied in turn to each wheel in a landing gear unit; and

(2) 60 percent of the limit drag and side loads, and 100 percent of the limit vertical load established under §§ 23.485 and 23.493 or lesser vertical load obtained under paragraph (c)(1) of this section, must be applied in turn to each wheel in the dual wheel landing gear unit.

[Amdt. 23–7, 34 FR 13090, Aug. 13, 1969]

WATER LOADS

§ 23.521 Water load conditions.

(a) The structure of seaplanes and amphibians must be designed for water loads developed during takeoff and landing with the seaplane in any attitude likely to occur in normal operation at appropriate forward and sinking velocities under the most severe sea conditions likely to be encountered.

(b) Unless the applicant makes a rational analysis of the water loads, §§ 23.523 through 23.537 apply.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23–45, 58 FR 42160, Aug. 6, 1993; Amdt. 23–48, 61 FR 5147, Feb. 9, 1996]

§ 23.523 Design weights and center of gravity positions.

(a) *Design weights.* The water load requirements must be met at each operating weight up to the design landing weight except that, for the takeoff condition prescribed in § 23.531, the design water takeoff weight (the maximum weight for water taxi and takeoff run) must be used.

(b) *Center of gravity positions.* The critical centers of gravity within the limits for which certification is requested must be considered to reach maximum design loads for each part of the seaplane structure.

[Doc. No. 26269, 58 FR 42160, Aug. 6, 1993]

§ 23.525 Application of loads.

(a) Unless otherwise prescribed, the seaplane as a whole is assumed to be subjected to the loads corresponding to the load factors specified in § 23.527.

(b) In applying the loads resulting from the load factors prescribed in § 23.527, the loads may be distributed over the hull or main float bottom (in order to avoid excessive local shear loads and bending moments at the location of water load application) using pressures not less than those prescribed in § 23.533(c).

(c) For twin float seaplanes, each float must be treated as an equivalent hull on a fictitious seaplane with a weight equal to one-half the weight of the twin float seaplane.

(d) Except in the takeoff condition of § 23.531, the aerodynamic lift on the